

## REMARKS

Examiner D. Owens is thanked for the thorough examination and search of the subject Patent Application. Claims 11-13, 15, 17, 19-25, and 42-51 have been amended, and new claims 52-145 have been added. No new matter has been added.

The Examiner is thanked for allowing Claims 26-32 and 34-41.

New claims 52-62, 63-74, 75-88, 89-101, 102-110, 112-115, 117-126, 127-133, and 134-145 provide further details of the invention as disclosed in the Specification.

New claims 52-62 claim the presence of a UBM layer on the die (see pages 13 and 16 and Figs. 3a, 3b, and 4). Openings formed in the substrate expose the UBM layer on the die (Fig. 3d). Akram et al's UBM layer (23 in Fig. 5, paragraph [0066]) is formed over the openings in the substrate 18, not exposed by the openings in the substrate 18. Thus, Akram et al (US2001/0021541) does not teach or suggest the method of claims 52-62.

New claims 63-74 claim that a conductive material deposited into an opening in a substrate is suited for connecting a die to external circuitry. This is disclosed in the Abstract where it is stated that the ball mounting connects the I/O pads at the chip sites to the next level of packaging directly. Akram et al. discloses that the process of depositing solder into apertures 120 in a carrier substrate 118 is performed for forming a conductive via 121 (See paragraph

[0064] and Fig. 4B). Akram et al. fails to disclose that the conductive material deposited into an opening in a substrate can be connected to an external circuitry, such as a next level of packaging. See also paragraph [0069] and Fig. 8A where Akram et al teaches that conductive trace 222 contacts bond pad 216 and then external package bumps 224 are formed in electrical communication with conductive trace 222. That is, conductive trace 222 itself is not suitable for connection with external circuitry. Thus, Akram et al. does not teach or suggest the method of Claims 63-74.

New claims 75-88 claim that after depositing an adhesive material over an active surface of a die, the step of joining the die and a carrier using the adhesive layer is performed. The carrier can be a substrate, for example. This method is described on pages 12-14 of the Specification and claimed also in allowed claim 26. Akram et al discloses that a carrier substrate 18 is secured to a semiconductor device 12 by means of an adhesive material (paragraph 52). However, Akram et al. does not teach or suggest that the adhesive material is deposited over an active surface of the semiconductor device 12 before the carrier substrate 18 is secured to the semiconductor device 12 using the adhesive material. Furthermore, Umehara et al. (US5,882,956) discloses a method comprising depositing an adhesive material 4 over a wafer 6; separating the wafer 6 and the adhesive material 4 into multiple dies over which the separated adhesive material 4 is deposited; and then joining the die and a lead frame using the separated adhesive material 4 (lines 60-19, cols. 6-7 and lines 38-47, col.7 and Figs. 1-5). Umehara et al. fails to disclose which side of the wafer the adhesive material is deposited over, before the separated die is joined to a lead frame using the adhesive material. New claims 75-88 claim that an adhesive material is deposited over an active surface of a die, and then the step of joining the

die and a carrier using the adhesive layer is performed, which is not taught by Umehara et al. The carrier can be a substrate, for example. Therefore, both Akram et al. and Umehara et al. fail to teach, hint or suggest that an adhesive material is deposited over an active surface of a die, and then the step of joining the die and a carrier using the adhesive layer is performed, so applicants respectfully submit claims 75-88 patently define over the prior art references.

New claims 89-101 claim that after depositing an adhesive material over a die, the step of joining the die and a carrier using the adhesive layer is performed. However, Akram et al does not teach or suggest depositing the adhesive material over the die before the carrier substrate is secured to the die. New claims 89-101 further claim that at least an opening is formed in an adhesive material and exposes a die, which is not taught by Akram et al. Umehara et al. (US5,882,956) discloses a method comprising depositing an adhesive material 4 over a wafer 6; separating the wafer 6 and the adhesive material 4 into multiple dies over which the separated adhesive material is deposited; and then joining the die and a lead frame using the separated adhesive material 4 (lines 60-19, cols. 6-7 and lines 38-47, col.7 and Figs. 1-5). Umehara et al. fails to disclose openings are formed in the adhesive material and expose the wafer. New claims 89-101 claim that at least an opening is formed in an adhesive material and exposes a die, which is not taught by Umehara et al. Therefore, both Akram et al. and Umehara et al. fail to teach, hint or suggest that at least an opening is formed in an adhesive material and exposes a die, so applicants respectfully submit claims 89-101 patently define over the prior art references.

New claims 102-111 claim multiple openings are formed in a substrate and expose a UBM layer (Fig. 3d). A conductive material is deposited over the UBM layer exposed by the

openings (Fig. 3f). Akram et al's UBM layer 23 (in Fig. 5 and paragraph [0066]) is formed over the openings in the carrier substrate 18, not exposed by the openings in the carrier substrate 18. A conductive material 24 is deposited over the UBM layer 23 formed over the openings in the carrier substrate 18 (Fig. 6). Akram et al. fails to teach, hint or suggest that multiple openings are formed in said substrate and expose a UBM layer and a conductive material is deposited over the UBM layer exposed by the openings. Thus, Akram et al (US2001/0021541) does not teach or suggest the method of claims 102-111.

New claims 112-116 claim that after depositing an adhesive material over a die, the step of joining the die and a substrate using the adhesive layer is performed. As detailed above, Akram et al does not teach or suggest depositing the adhesive material over the die before the carrier substrate is secured to the die. Umehara et al. (US5,882,956) discloses a method comprising depositing an adhesive material 4 over a wafer 6; separating the wafer 6 and the adhesive material 4 into multiple dies over which the separated adhesive material 4 is deposited; and then joining the die and a lead frame, not a substrate, using the separated adhesive material 4 (lines 60-19, cols. 6-7 and lines 38-47, col.7 and Figs. 1-5). Umehara et al. fails to disclose a substrate that the die can be joined to using the separated adhesive material 4 after depositing the adhesive material 4 over the die. New claims 112-116 claim that an adhesive material is deposited over a die, and then the step of joining the die and a substrate using the adhesive layer is performed, which is not taught by Umehara et al. As a result, applicants respectfully submit new claims 112-116 patently define over the prior art references.

New claims 117-126 claim that a metal layer can be formed over a passivation layer before joining a die and a substrate, wherein multiple openings are formed in the substrate and expose the metal layer (page 10 of the Specification and Figs. 2b and 3d). Akram et al. does not teach or suggest forming a metal layer over a passivation layer before joining a substrate to a wafer. Thus, Akram et al. does not teach or suggest the method of Claims 117-126.

New claims 127-133 claim that multiple openings formed in a substrate expose multiple pads exposed by a passivation layer (Fig. 2h). Akram et al. does not teach or suggest multiple openings formed in a substrate expose multiple pads exposed by a passivation layer. Thus, Akram et al. does not teach or suggest the method of Claims 127-133.

New Claims 134-145 claim that after separating a wafer, the step of joining at least one of the dies and a substrate is performed. After the die and substrate are joined, the substrate is separated (Figs. 2f and 2i). Akram et al. (US2001/0021541) discloses that a conductive via 121 is formed by depositing solder into apertures 120 in a carrier substrate 118 deposited on a semiconductor device 112 (paragraph [0064] and Fig. 4B). Akram et al teaches that a carrier substrate may be joined to a semiconductor device before or after the device has been separated from the wafer (paragraph [0016]). However, Akram et al does not teach separating the carrier substrate after the carrier substrate has been joined with the semiconductor device. Akram et al fails to suggest the order of steps claimed in Claim 134: 1) separating the wafer into dies (page 9 of the Specification), 2) joining at least one of the dies and a substrate (page 11), and 3) separating the substrate (page 12).

All Claims are believed to be in condition for Allowance, and that is so requested.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 11-13, 15, 19, 20, and 22-25 as being unpatentable over Akram et al in view of Thomas, Master et al, and Fanworth is requested in view of Amended Claims 11-13, 15, 17, and 19-25 and in accordance with the following remarks.

Amended Claim 11 claims that after separating a wafer, the step of joining at least one of the dies and a substrate is performed. After the die and substrate are joined, the substrate is separated. Akram et al. (US2001/0021541) discloses that a conductive via 121 is formed by depositing solder into apertures 120 in a carrier substrate 118 deposited on a semiconductor device 112 (paragraph [0064] and Fig. 4B). Akram et al teaches that a carrier substrate may be joined to a semiconductor device before or after the device has been separated from the wafer (paragraph [0016]). However, Akram et al does not teach separating the carrier substrate after the carrier substrate has been joined with the semiconductor device. The references, singly or in combination, do not teach or suggest the order of steps claimed in amended Claim 11: 1) separating the wafer into dies (page 9 of the Specification), 2) joining at least one of the dies and a substrate (page 11), and 3) separating the substrate (page 12).

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 11-13, 15, 19, 20, and 22-25 as being unpatentable over Akram et al in view of Thomas, Master et al, and Fanworth is requested in view of Amended Claims 11-13, 15, 17, and 19-25 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claim 17 as being unpatentable over Akram et al in view of Fanworth, Thomas, and Master et al and further in view of Umehara et al is requested in view of Amended Claim 17 and in accordance with the following remarks.

Claim 17 has been amended to remove the particular adhesive material from the claim as this material is not essential to Applicants' invention. Amended Claim 17 provides details about the die structure as taught on pages 9-10 of the Specification. The references, singly or in combination, do not teach the steps of : 1) separating the wafer into dies, 2) joining at least one of the dies and a substrate, and 3) separating the substrate as claimed in amended Claim 11 and as discussed above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claim 17 as being unpatentable over Akram et al in view of Fanworth, Thomas, and Master et al and further in view of Umehara et al is requested in view of Amended Claim 17 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claim 21 as being unpatentable over Akram et al in view of Fanworth, Thomas, and Master et al and further in view of Yamamoto et al is requested in view of Amended Claim 21 and in accordance with the following remarks.

Claim 21 has been amended to remove the details of attaching the substrate to the die as this material is not essential to Applicants' invention. Claim 21 now claims the formation of an

adhesive material over the wafer, separating the wafer, and thereafter joining the wafer to the substrate using the adhesive material. This sequence of steps is not taught or suggested by the references.

Reconsideration of the rejection under 35 U.S.C. 103 of Claim 21 as being unpatentable over Akram et al in view of Fanworth, Thomas, and Master et al and further in view of Yamamoto et al is requested in view of Amended Claim 21 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 42-45 and 47-51 as being unpatentable over Akram et al in view of Fanworth, Thomas, Master et al, and Yamamoto et al is requested in view of Amended Claims 42-51 and in accordance with the following remarks.

In Claim 42, applicants claim that after depositing an adhesive material over a substrate, the step of joining a die and the substrate using the adhesive layer is performed. Akram et al discloses that a carrier substrate 18 is secured to a semiconductor device 12 by means of an adhesive material (paragraph [0052]). However, Akram et al. does not teach or suggest that the adhesive material is deposited over the substrate 18 before the substrate is secured to the semiconductor device 12 using the adhesive material. Thus, Akram et al. does not teach or suggest the method of claims 42-51.



MEG-00-012

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 42-45 and 47-51 as being unpatentable over Akram et al in view of Fanworth, Thomas, Master et al, and Yamamoto et al is requested in view of Amended Claims 42-51 and in accordance with the remarks above.

Allowance of all Claims is requested.

It is requested that should Examiner Owens not find that the Claims are now Allowable that he call the undersigned at 845 452-3204 to overcome any problems preventing allowance.

Respectfully submitted,

A handwritten signature in cursive script that reads "George O. Saile". The signature is written in dark ink and is positioned above the printed name.

George O. Saile, Reg. No. 19,572